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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2884	

MAIL DATE	DELIVERY MODE
10/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/511,734	PROTIC ET AL.	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 January 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

National Stage Application

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 July 2007 has been entered.

Specification

2. The disclosure is objected to because of the following informalities: "grooves 5" in line 27 on pg. 9 should probably be --grooves-- (37 CFR 1.437 and PCT Rule 11.13(m)). Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

4. Claim 8 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Amended dependent claim 8 recites the limitation "wherein the amorphous layer is not doped". Applicant argues that support for this amendment may be found at pg. 6, line 11 to pg. 7, line 10. The specification states (pg. 6, line 11 to pg. 7, line 10) that "Very good results have been achieved with an amorphous layer made of germanium. ... The crystalline region beneath the amorphous layer then preferably also consists of germanium. ... The amorphous layer is always applied to a semiconductor material. The amorphous layer therefore provides an electrical conductivity, which is substantially smaller than the conductivity of the material disposed beneath the amorphous layer. In one exemplary embodiment for the manufacture of the invention, an amorphous germanium layer is initially applied by sputtering or vapour deposition. ... Grooves are etched in the amorphous germanium-metallic layer to such a depth that they extend at least into the germanium crystal region. These grooves advantageously extend into the germanium crystal. The opposing contact (p^+) has already been produced on the opposite side by doping with boron and subsequent microstructuring". Thus there is no express disclosure in the application as filed that the amorphous layer is not doped. While there is no *in haec verba* requirement, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure (MPEP § 2163). Further, the passage cited by applicant as support for the newly added claim limitation also does not appear to contain an implicit or inherent disclosure that the amorphous layer is not doped. Therefore, the newly added claim limitation was not described in the specification as filed.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1 and 3-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamacher *et al.* (Performance of position -sensitive germanium detectors in nuclear reaction experiments, Nuclear Instruments & Methods in Physics Research, Vol. A295, no. 1-2 (October 1990), pp. 128-132) in view of Luke *et al.* (Amorphous Ge bipolar blocking contacts on Ge detectors, IEEE Transactions on Nuclear Science, Vol. 39, no. 4 (August 1992), pp. 590-594).

In regard to claims **1**, **3-5**, **7**, and **8**, Hamacher *et al.* disclose (Fig. 1) a camera with a position-sensitive detector for measuring charged particles comprising a crystalline substrate formed of semiconductor material (*e.g.*, high-purity germanium) and a surface region, the surface region comprising blocking contacts (formed by boron ion implantation) with a structured, metallic layer comprises Al (aluminum) disposed above it, wherein the structure of the metallic layer continues through the blocking contacts and at least partially into the crystalline substrate (see "transferring the structure into

the semiconductor material by etching" in Fig. 1). The detector of Hamacher *et al.* lacks that the blocking contacts comprise a germanium (or silicon) amorphous layer disposed on the crystalline structure, wherein the amorphous layer is not doped. Luke *et al.* teach (section 1) to apply an undoped germanium amorphous layer on a p- or n-doped germanium crystalline semiconductor structure, in order to obtain good bipolar blocking contacts. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an undoped amorphous germanium layer instead of the boron doped layer in the detector of Hamacher *et al.*, in order to obtain good bipolar blocking contacts.

In regard to claim **6** which is dependent on claim 1, Hamacher *et al.* also disclose (section 3.1, last paragraph on the right column on pg. 129) that the structure is formed from segments having a mutual spacing of less than 100 μm.

In regard to claim **9** which is dependent on claim 1, Hamacher *et al.* in view of Luke *et al.* is applied as in claim 1.

It is noted that claim 9 recites that the camera is a tomograph or compton camera which appears to be mere statements of purpose or use and does not appear to imply any additional structural limitations of the camera with a position-sensitive detector as recited in claim 1. Applicant is advised that should claim 1 be found allowable, claim 9 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing

one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

In regard to claims **10** and **11** which are dependent on claim 6, Hamacher *et al.* also disclose (section 3.1, last paragraph on the right column on pg. 129) that the mutual spacing is less than 100 μm (*e.g.*, less than 20 μm).

In regard to claim **12**, Hamacher *et al.* disclose (Fig. 1) a method of producing a position-sensitive detector for measuring charged particles, comprising: providing a crystalline substrate (*e.g.*, high-purity germanium); forming a blocking layer on the substrate by boron ion implantation; disposing on the blocking layer a metallic layer (*i.e.*, aluminum); removing portions of the metallic layer, the blocking layer and the crystalline substrate such that at least one structured electrode is formed (see "transferring the structure into the semiconductor material by etching" in Fig. 1). The method of Hamacher *et al.* lacks that forming the blocking layer comprise disposing on the substrate an amorphous Germanium layer. Luke *et al.* teach (section 1) to apply a germanium amorphous layer on a p- or n-doped germanium crystalline semiconductor structure, in order to obtain good bipolar blocking contacts. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an undoped amorphous germanium layer instead of the boron doped layer in the method of Hamacher *et al.*, in order to obtain good bipolar blocking contacts.

Response to Arguments

8. Applicant's arguments filed 30 July 2007 have been fully considered but they are not persuasive.

Applicant argues (last paragraph on pg. 5 of remarks filed 30 July 2007) that a disclosure of the conductivity of the amorphous Germanium being less than that of the substrate would indicate an embodiment in which the amorphous Germanium is not doped. Examiner respectfully disagrees. First it should be noted that a doped amorphous Germanium layer can have a lower conductivity than the substrate. Therefore, a statement concerning the difference in conductivity between an amorphous Germanium layer and a substrate does not necessarily lead to a conclusion of an implicit embodiment in which the amorphous Germanium is not doped.

Applicant also argues (last paragraph on pg. 5 of remarks filed 30 July 2007) that the a-Ge is applied by sputtering or vapor deposition and not subsequently doped indicating that undoped Germanium is used. Examiner respectfully disagrees. First it should be noted that each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure (MPEP § 2163.05). There does not appear to be an express disclosure that undoped Germanium is used. Further as discussed above, undoped Germanium is not implicitly or inherently required in order for an amorphous Germanium layer to have a lower conductivity than the substrate. Therefore, a lack of a description as to the doping of the amorphous Germanium layer does not indicate that undoped Germanium is used.

Applicant argues (first four paragraphs on pg. 6 of remarks filed 30 July 2007) that it is not believed that Hansen *et al.* provide motivation to make the specific structure claimed by the applicant. Examiner respectfully disagrees. Hansen *et al.* was discussed in the prior office action simply because it was cited by applicant as support

for applicant's arguments. In regard to a passivation layer, Hansen *et al.* state (discussion section on pg. 250) that " ... An important use for this technique is in making multi-detector arrays for which case the detectors can be fabricated and tested one-by-one without concern for any ambient degradation before mounting in the final system ... ". Thus teaching that a passivation layer can be important during fabrication and testing as a protection from ambient degradation. Therefore, Hansen *et al.* teach that protection from ambient degradation can be provided by either (a) a passivation layer or (b) mounting in a final system. Hansen *et al.* also state (second paragraph of the right column on pg. 250 of Hansen *et al.*) that "Because of this effect, coated devices are limited to a maximum operating temperature of about 120°K (for 10^{-9} A leakage) for high resolution spectroscopy, whereas a comparable bare device could be operated at 160°K if surface contamination can be avoided". Thus a passivation layer is expressly disclosed by Hansen *et al.* as having undesirable qualities (*e.g.*, the increased in leakage current compared to a "bare" surface as illustrated in Fig. 7 of Hansen *et al.*). In this context, it is significant that the germanium detector of Hamacher *et al.* comprises bare surfaces between contacts. Thus, modification of the germanium detector of Hamacher *et al.* to add a passivation layer between contacts would lead to the advantage of protection from ambient degradation during fabrication and testing and the disadvantage of an increased leakage current (relative to bare surfaces) during detector operation. Therefore, addition of a passivation layer between contacts may not be desirable in all situations.

Applicant argues (last paragraph on pg. 6 to last paragraph on pg. 7 of remarks filed 30 July 2007) that there would have been no motivation to combine

Hamacher *et al.* with Luke *et al.* since it is not true that replacing a B doped layer with an a-Ge layer would lead to an enhanced blocking contact since the contact used by Hamacher *et al.* is already a very good blocking contact. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, there is some teaching, suggestion, or motivation to do so found in the references themselves. Luke *et al.* state (discussion section on pg. 250) that " ... Blocking contacts on Ge detectors typically consist of n-type contacts formed by lithium diffusion and p- type contacts formed by boron ion implantation. ... In this paper, we report on the performance of high-purity Ge radiation detectors with a-Ge contacts fabricated using RF sputtering techniques. Preliminary results show sputtered a-Ge contacts can be used as blocking contacts on Ge radiation detectors with potential advantages over conventional contacts". Thus Luke *et al.* expressly teach an a-Ge contact as an alternative to conventional boron ion implantation contacts with potential advantages. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an undoped amorphous germanium layer instead of the boron doped layer in the detector of Hamacher *et al.*, in order to obtain good bipolar blocking contacts.

Conclusion

9. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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